We claim:

1. A single reactant component immobilized over a single electrode.

2. The single reactant component of claim 1, wherein the single reactant component is a chemical, a biomolecule, a microorganism, or a cell.

3. The single reactant component of claim 2, wherein the chemical is a small molecule or a ligand.

4. The single reactant component of claim 2, wherein the biomolecule is peptide, a protein, a nucleic acid molecule, or a receptor.

5. The single reactant component of claim 2, wherein the microorganism is a bacterium.

6. The single reactant component of claim 5, wherein the bacterium is *E. coli.*

7. The single reactant component of claim 2, wherein the cell is an osteoblast, a glial cell, or a neuron.

8. The single reactant component of claim 1, wherein the single electrode comprises iridium, platinum, palladium, gold, silver, copper, mercury, nickel, zinc, titanium, tungsten, aluminum, carbon, graphite, a metal oxide, a conducting polymer, a metal doped polymer, a conducting ceramic, a conducting clay, or a combination thereof.

9. The single reactant component of claim 1, wherein the single electrode has a diameter of about 60 μm to about 80 μm.

10. The single reactant component of claim 1, wherein the single electrode has a diameter of about 40 μm to about 60 μm.

11. The single reactant component of claim 1, wherein the single electrode has a diameter of about 20 μm to about 40 μm.

12. The single reactant component of claim 1, wherein the single electrode is placed on or immobilized on a substrate.

13. The single reactant component of claim 12, wherein the substrate comprises silicon, silicon dioxide, silicon nitride, glass, fused silica, borosilicate, gallium arsenide, indium phosphide, aluminum, ceramics, polyimide, quartz, a plastic, a resin, a polymer, a superalloy, zircaloy, steel, gold, silver, copper, tungsten, molybdeumn, tantalum, Kovar™, Kevlar™, Kapton™, Mylar™, Teflon®, brass, sapphire, fiberglass, a ceramic, mica, or a combination thereof.

14. A plurality of the single reactant component of claim 1.

15. A device comprising the single reactant component of claim 1.

16. The device of claim 15, and further comprising a second single reactant component immobilized over a second single electrode.

17. The device of claim 16, wherein the second single reactant component may be the same as or different from the single reactant component.

18. The device of claim 15, and further comprising a plurality of single reactant components immobilized over single electrodes, wherein the single reactant components may be the same or different.

19. The device of claim 15, and further comprising a substrate upon which the single electrode is placed or immobilized.

20. The device of claim 19, wherein the substrate comprises silicon, silicon dioxide, silicon nitride, glass, fused silica, borosilicate, gallium arsenide, indium phosphide, aluminum, ceramics, polyimide, quartz, a plastic, a resin, a polymer, a superalloy, zircaloy, steel, gold, silver, copper, tungsten, molybdeumn, tantalum, Kovar™, Kevlar™, Kapton™, Mylar™, Teflon®, brass, sapphire, fiberglass, a ceramic, mica, or a combination thereof.

21. The device of claim 15, and further comprising a permeation layer, an electrode pad, a measurement system, an environment chamber, a pulse generator, a micromanipulator, a CCD

camera, a multichannel oscilloscope, a digital signal processor, a MEMS mixer, a suction system, a filter, a microreservoir, a microfluidic channel, a treatment cassette, a detection cassette, a data recording element, a reagent storage module, a mixing chamber, a reaction chamber, or combinations thereof.

22. A method of making the single reactant component immobilized over the single electrode of claim 1, which comprises using an alternating current field to position the single reactant component over the single electrode.

23. The method of claim 22, which further comprises using AC electrical field to position single reactant component over the single electrode.

24. The method of claim 22, which further comprises controlling the conductivity of a buffer solution which comprises the single reactant component.

25. A biosensor which comprises the single reactant component immobilized over the single electrode of claim 1.

26. A method of assaying, analyzing, or monitoring a target analyte which comprises contacting a sample suspected of having the target analyte with the single reactant component of claim 1 and detecting a change or a result, if any.

27. The method of claim 26, wherein the result is compared with a standard or a control.

28. The method of claim 26, wherein detecting the change comprises conducting AC impedance, impedance spectroscopy, cyclic voltammetry, AC voltammetry, pulse voltammetry, square wave voltammetry, AC voltammetry, hydrodynamic modulation voltammetry, conductance, potential step method, potentiometric measurement, amperometric measurement, current step method, Fourier transformation analysis, wavelet transformation analysis, or a combination thereof.

29. A method of identifying an unknown analyte as a known analyte or being similar to a known analyte which comprises contacting a sample suspected of having the unknown analyte with the single reactant component of claim 1, determining a signature pattern vector for the

unknown analyte and comparing the signature pattern vector with the signature pattern vector of the known analyte or the signature pattern vectors in a signature pattern vector database.

30. A signature pattern vector database comprising a plurality of signature pattern vectors for a plurality of reactant components according to claim 1.